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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,278	12/28/2001	Dong Wook Roh	HI-0068	4108

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FLESHNER & KIM, LLP
P.O. BOX 221200
CHANTILLY, VA 20153

EXAMINER	
PATHAK, SUDHANSHU C	
ART UNIT	**PAPER NUMBER**
2634	

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/029,278	ROH, DONG WOOK	
	Examiner	Art Unit	
	Sudhanshu C. Pathak	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *December 28th, 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-13 and 18-26* is/are allowed.

6)☒ Claim(s) *14,16 and 17* is/are rejected.

7)☒ Claim(s) *15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *December 28th, 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-to-26 are pending in the application.

Drawings

2. The drawings **(Fig. 4 & 5)** are not of sufficient quality to permit examination. Accordingly, replacement drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to this Office action. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures.

Specification

3. The disclosure is objected to because of the following informalities:

The Abstract on lines 1-2 discloses ".....in a CDMA mobile communication system.....", this should actually be ".....in a code division multiple access (CDMA) mobile communication system.....".

The Abstract on line 13 discloses ".....the length of an IFW.....", this should actually be ".....the length of an interference free window (IFW)....."

The Specification on Page 10, line 8 discloses ".....m is a natural number.....", however, the variable "m" is not defined, and it is not clear as to where this variable is used.

Appropriate correction is required.

Claim Objections

4. Claim 4 is objected to because of the following:

Claim 4 recites the limitation "the prescribed condition" in line 1. There is insufficient antecedent basis for this limitation in the claim. Furthermore, the claim does not define the variable "L_{IFW}".

Appropriate correction is required.

5. Claim 12 is objected to because of the following informalities:

The claim in line 4 discloses ".....length of the IFW interval.....", this should actually be ".....length of the interference free window (IFW) interval.....".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 14 & 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rice (PG-PUB No. 2005/0025219) in view of Applicant Admitted Prior Art (AAPA) in further view of Jou (PG-PUB No. 2003/0072331).

Regarding to Claims 14 & 16-17, Rice discloses a method for generating and allocating code pairs using orthogonal spreading codes comprising determining one of at least one orthogonal code set as a representative

orthogonal code set (Abstract, lines 1-8 & Page 1, Paragraph 1, 3, 5 & Page 1, Paragraph 8-9 & Page 2, Paragraph 9 & Page 2, Paragraphs 17-18 & Page 3, Paragraphs 19, 22, 29-32, 37); generating a code pair set based upon the at least one code pair; and allocating a code order based upon the at least one code pair included in the code pair set (Page 3, Paragraph 37 & Page 4, Paragraph 38-48 & Page 5, Paragraphs 49-51). However, Rice does not disclose determining weather to allocate the same or different orthogonal spreading codes to an I branch and a Q branch and generating the spreading codes so as to minimize the peak-to-average power ratio.

The Applicant Admitted Prior Art (AAPA) discloses determining weather to allocate the same or different orthogonal spreading codes to an I branch and a Q branch depending on the data modulation scheme (Specification, Page 5, lines 2-7 & Specification, Page 13, lines 19-23 & Fig.'s 1-2). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the AAPA teaches determining weather to allocate the same or different orthogonal spreading codes to an I branch and a Q branch depending on the data modulation scheme and this can be implemented in the code generating system as described in Rice so as to minimize the interference between the symbols transmitted. However, Rice in view of AAPA does not disclose generating the spreading codes so as to minimize the peak-to-average power ratio.

Jou discloses a method and apparatus for transmitting information in a multi-carrier communication system (Abstract, lines 1-2). Jou also discloses

in the communications system each channel is spread by a unique orthogonal spreading sequence (Page 1, Paragraph 5). Jou also discloses each spreading sequence to minimize the peak-to-average power ratio (Page 5, Paragraphs 49-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Jou teaches implementing the spreading code so as to minimize the peak-to-average power ratio and this can be implemented in the system as described in Rice in view of AAPA so as to increase the capacity of the communication system.

Allowable Subject Matter

8. Claims 1-11 & 18-21 are allowed.

   Claims 1-11 & 19-21are allowable over the prior art of record because the cited references do not contain the specified limitation of a method for allocating code pairs of **orthogonal spreading codes having guard bits of 0**, comprising: generating at least one orthogonal code set based upon the orthogonal spreading codes; determining one of the at least one orthogonal code set as a representative orthogonal code set; and allocating an order of code pairs according to a prescribed rule based upon the representative orthogonal code set.

9. Claims 12-13 are allowable.

   Claims 12-13 are allowable over the prior art of record because the cited references do not contain the specified limitation of a method for generating an orthogonal code set using orthogonal spreading codes, comprising: generating orthogonal spreading codes corresponding to a

prescribed code length; **adjusting** an interval of a length of an interference free window (IFW) **based** upon a prescribed code component length; and generating at least one orthogonal code set based upon the orthogonal spreading code **if** the length of the IFW interval is adjusted.

10. Claims 22 & 25 are allowable.

Claims 22 & 25 are allowable over the prior art of record because the cited references do not contain the specified limitation of a method (and apparatus) to generate orthogonal code sets, comprising: selecting a code length N equal to or larger than 4; determining whether the selected code length N equals 2^m, where m is equal to or larger than 2; generating an orthogonal spreading code if N equals 2^m; selecting a code component length L_{GUARD} and an IFW length L_{IFW}; determining whether $L_{GUARD} >= L_{IFW} >= 0$ is true; selecting a new L_{GUARD} and L_{IFW} until $L_{GUARD} >= L_{IFW} >= 0$ is true; calculating g based on $2^{g-1} <= L_{IFW} <= 2^g$ if $L_{GUARD} >= L_{IFW} >= 0$; setting k equal to 1, and j equal to 0; repeating adding k-1 2^{m-g} +j orthogonal spreading code to the k^{th} orthogonal code set and adding 1 to j until $j > 2^{m-g} - 1$ is true; adding 1 to k if $j > 2^{m-g} - 1$ is true; if $k > 2^g$ is not true, repeat adding the 2^{m-g} +j orthogonal spreading code to the k^{th} orthogonal code set and adding 1 to k until $k > 2^g$ is true; and selecting one orthogonal code set from the generated orthogonal code sets as the representative orthogonal code set if $k > 2^g$ is true.

11. Claims 23-24 & 26 are allowable.

Claims 22-24 & 25 are allowable over the prior art of record because the cited references do not contain the specified limitation of a method (and apparatus) of allocating code pairs using a representative orthogonal code set, comprising: determining whether orthogonal spreading codes are to be differently allocated to an I branch and a Q branch or to be similarly allocated to the I branch and the Q branch; if orthogonal spreading codes are to be differently allocated, determining whether code pairs to minimize peak-to-average power ratio ate to be allocated; if orthogonal spreading codes ate to be differently allocated to an I branch and a Q branch, and are to be allocated to minimize peak-to-average power ratio, allocate orthogonal spreading codes by: arraying the elements of the orthogonal code set in an ascending order, wherein the ascending order comprises a a first element, a center element, an element before center and a last element, pairing the first element with the center element, and pairing the element before center with the last element; if orthogonal spreading codes are to be differently allocated to an I branch and a Q branch and are not to be allocated to minimize peak-to-average power ratio, allocate orthogonal spreading codes by: arraying the elements of the orthogonal code set in an ascending order, wherein the ascending order comprises a first half of elements with a first element, a quarter-center element in the center of the first half of elements, and a last element, pairing the first element with the first element from the quarter-center element, and quartet-center with the last element; if the orthogonal spreading codes are to be similarly

allocated to the I branch and the Q branch allocate orthogonal spreading codes by allocating code pairs in accordance with:

$L = \{I_o, I_1, \ldots, I_2^{m-g-2}, I_2^{m-g-1}\}$ wherein a representative orthogonal code set is expressed as:

$P = \{(I_o, I_2^{m-g-1}), (I_1, I_2^{m-g+1}), \ldots, (I_2^{m-g-1}{}_{-1}, I_2^{m-g}{}_{-1})\}$

12. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, it is recommended to the applicant to amend all the claims so as to be patentable over the cited prior art of record. A detailed list of pertinent references is included with this Office Action (See Attached "Notice of References Cited" (PTO-892)).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)-272-3056
- The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sudhanshu C. Pathak

STEPHEN CHIN
SUPERVISORY PATENT EXAMINE
TECHNOLOGY CENTER 2600